

N74. BEZNAU 1 PLANS STEAM GENERATOR REPLACEMENT

Nordostschweizerische Kraftwerke (NOK) is the sole owner and operator of Beznau 1, located between Zurich and Basel on the Aare River in Switzerland. The 364-MWe unit has a Westinghouse two-loop pressurized water reactor.

The story of the Beznau 1 steam generators is long and troubled. Problems with the tubing began only a year after commercial operation. Since then, the steam generators have experienced the complete spectrum of tube defects: intergranular stress corrosion cracking (IGSCC) within the tubesheet; IGSCC above the tubesheet within the sludge pile; wastage at the cold leg above the tubesheet; and fretting at anti-vibration bars. These defects have resulted in a total of 19% plugged and 10% sleeved tubes.

A project team was formed in 1987 to decide on a steam generator replacement project at Beznau and to work out a strategy. The team analyzed:

- Steam generator history.
- Suitability of the spare steam generators.
- Maintenance and inspection expenditure.
- Authority position.
- Possibilities for plant uprating and plant life extension.

The team also performed an economic assessment, which revealed that steam generator replacement might be attractive if it could be combined with uprating of the plant. Two new steam generators are being manufactured by Framatome. A consortium of Siemens in Germany and Sulzer Brothers in Switzerland will perform the actual replacement of the Steam generators on site during the 1993 refuelling outage. Planning activities began in October 1990 and will last until mid-1992, and according to the contractual schedule, the replacement will take 57 days from reactor trip to pressure test. The overall project budget is around \$100 million. The project organization at NOK is convinced that this substantial investment will bring advantages to plant maintenance, operation, and availability. Further, it opens attractive perspectives towards plant uprating and plant life extension and thus, is economically justifiable.

For more, see Sandona, E., "Why Replace the Steam Generators at Beznau 1?," Nuclear Engineering International, pp. 23-25, January 1991.